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(a) Amendments to the Specification

Replace paragraph [0022] with the following amended paragraph:

[0022] FIG. 1 schematically shows an exemplary embodiment of a confocal scanning microscope 100. This is not intended, however, to be construed as a limitation of the invention. Illuminating light beam 3 coming from at least one illumination system 1 is directed by a beam splitter or a suitable deflection means 5 to a scanning module 7. Before illuminating light beam 3 strikes deflection means 5, it passes through an illumination pinhole 6. Scanning module 7 encompasses a gimbal-mounted scanning mirror 9 that guides illuminating light beam 3, through a scanning optical system 12 and a microscope optical system 13, over or through a specimen 15. Illumination system 1 can be configured in such a way that it generates white light from the light of a laser [[10]]. A microstructured element 8 or a tapered glass fiber is provided for this purpose. For biological specimens 15 (preparations) or transparent specimens, illuminating light beam 3 can also be guided through specimen 15. For these purposes, non-luminous specimens are, if applicable, prepared with a suitable dye and often also with several dyes (not depicted, since established existing art). The dyes present in specimen 15 are excited by illuminating light beam 3 and emit light in a characteristic region of the spectrum peculiar to them. This light proceeding from specimen 15 defines a detected light beam 17. Detected light beam 17 travels to a detector module 22. Detected light beam 17 travels through microscope optical system 13 and scanning optical system 12 and via scanning module 7 to deflection means 5, passes through the latter, and travels to detector module 22. Through a detection pinhole 18, it strikes at least one detector 36, 37 embodied respectively as a photomultiplier. It is evident to one skilled in the art that other detection components, for example diodes, diode arrays, photomultiplier arrays, CCD chips, or CMOS image sensors, can also be used. Detected light beam 17 proceeding from or defined by specimen 15 is depicted in FIG. 1 as a dashed line. In detectors 36, 37, electrical detected signals proportional to the power level of the light proceeding from specimen 15 are generated. Since, as already mentioned above, light of not only one wavelength is emitted from specimen 15, it is useful to provide an SP module 20 in front of the at least one detector 36, 37. The data generated by the at least one detector 36, 37 are delivered to a computer system 23. At least one peripheral 27 is associated with computer system 23. Peripheral 27 can be, for example, a display on which the user receives instructions for setting scanning microscope 100, or can view the current setup and also the image data in graphical form. Also associated with computer system 23 is an input means that comprises, for example, a keyboard, an adjusting apparatus for the components of the microscope system, and/or a mouse. A memory 24, in which the signatures are stored as data sets, is likewise associated with computer system 23. Additionally implemented in computer system 23 is a software program 25 with which the appropriate calculations for the method according to the invention can be carried out. Setting elements 40, 41 for image recording are additionally depicted on display 27. In the embodiment shown here, setting elements 40, 41 are depicted as sliders. Setting elements 40, 41 can also be embodied as check boxes which make possible yes/no activation for specific parameters. Any other embodiment lies within the specialized ability of one skilled in the art.

Replace paragraph [0027] with the following amended paragraph:

[0027] FIG. 4 graphically depicts projections, at different times, of intensity values each having identical coefficients of a coordinate. At a time T_1, image 50_1 of specimen 15 is recorded, and distribution function 60_1 referring to X axis x, and a distribution function 61_1 referring to the Y axis, are ascertained. Specimen 15 contains, for example a first and a second element 58, 59. In distribution function 60_1 referring to the X axis, locations 74, 75 of first and second element 58, 59 are ascertained. In distribution function 61_1 referring to the Y axis, locations 78, 79 of first and second element 58, 59 are likewise ascertained. At a time T_2, image 50_2 of specimen 15 is recorded, and distribution function 60_2 referring to X axis x, and a distribution function 61_2 referring to the Y axis, are determined. For first and second element 58, 59 present in specimen 15, locations 74, 75 of first and second element 58, 59 with reference to the X axis are ascertained from distribution function 60_2. Similarly, the locations 78, 79 of first and second element 58, 59 with reference to the Y axis are ascertained from distribution function 61_2. From a comparison of locations 74, 75, 78, and 79, conclusions can be drawn as to the changes in first and second element 58, 59. In the example depicted in FIG. 4, for element 58 there is an increase in size with no change in location. For second element 59, a change in location is determined. Scanning microscope 100 can now be adjusted correspondingly for second element 59 so that element 59 is always at the center of an image window (not depicted).

Replace paragraph [0047] with the following amended paragraph:

[0047] It remains to note that even the more recent variants of the basic inference idea, such as fuzzy control, neuro-fuzzy control, Bayes networks, etc., change nothing in terms of the principle but simply generate soft and continuous statements using the rule base, instead of the hard decision boundaries defined by Boolean logic. In these approaches, the time-honored logic elements AND, OR, NOT, IF, THEN, etc. are explicitly or implicitly replaced by softer equivalents. In the case of approaches based on probability theory such as Bayes, the rules have a probability assigned to them by the rule mechanism, those rules with maximum probability being selected. This is sufficiently familiar to one skilled in the art and may be advantageous in the context of an implementation without contradicting the teaching of this invention. The possibility also exists of constructing the inference machine directly as a computer program in code. In the system, individual rules 81 are iteratively picked out from the set of all rules and facts 80, and their premises are tested. Because of the iterative embodiment, at runtime the method therefore generates a tree of rules having confirmed premises 82, which can be interpreted as an argumentation or proof. The process continues until no further rules are proven and derivable control signals are present.

Replace paragraph [0048] with the following amended paragraph:

[0048] FIG. 6 schematically depicts a portion of a microscope system that shows the connection between computer system 23 and the various positioning elements of scanning microscope 100. In an embodiment, for example, an FPGA 63 which performs the calculation of spectral signatures for each axis can be provided. FPGA 63 can be arranged in the microscope itself, or can be housed in a separate electronics box 64 provided for it, or embodied as a plug-in module in the computer itself. In the exemplary embodiment depicted in FIG. [[4]] 6, FPGA 63 is housed in an electronics box 64. It is also conceivable to perform for each axis a calculation of the spectral signatures that is implemented in software. Both software program 25 and/or FPGA 63 can coact in appropriate fashion. A calculation of statistical signature parameters implemented in software program 25/FPGA 63 is implemented. Also provided is a software module 25a that serves to track changes in the signatures. A further software module 25b serves to interpret the change and convert it into corresponding actuator signals. For example, scanning microscope 100 is equipped with an XYZ stage 65 that is configured to be displaceable in all three spatial directions. A positioning motor, with which a suitable displacement of XYZ stage 65 is performed, is provided for each axis. The signals for displacement are generated by further software module 25b. Further software module 25b also generates signals for displacing an objective turret 67 of scanning microscope 100. Objective turret 67 encompasses a first positioning motor 68 to rotate objective turret 67, so that one of the several objectives 70 is brought into the working position. A second positioning motor or actuator 69 (piezo) that produces a relative motion between objective turret 67 and XYZ stage 65 can additionally be provided. Selection of a different objective 70 is activated, for example, if the result of the calculations by software modules 25a and 25b necessitates selection of a new image window. Appropriate control signals are also supplied to galvanometers 71 of scanning module 7. A detector module 22 is likewise adjustable by way of at least one suitable positioning element 73 in accordance with stipulations made by the user and/or at least one of software modules 25a or 25b. A further displacement possibility exists by way of suitable adjustment of the illuminating light. A positioning means 72 that actuates a selection means 76 in order to select a specific spectral region of a spectral illumination is provided for this purpose. The number of actuation possibilities depends substantially on the way in which the microscope system is equipped. A standard configuration of a scanning microscope often also has, for example, an XY stage and a coarse Z actuator in addition to an XYZ galvanometer control system for controlling the scanning point, resulting in two sets of actuators for X, Y and Z, respectively, that can be used for control purposes. The exact embodiment in terms of when a particular actuator is controlled is left to the ability of one skilled in the art, who selects the control base in such a way that large displacement travels are compensated for with the coarse actuator, and small displacement travels with the fine actuator. It remains to note that a compensation for spectral changes makes sense only in a system that is equipped with an adjustable spectral detector. In general, any degree of freedom in an XYZ-lambda context can thus be compensated for, provided the microscope configuration has actuators for that degree of freedom.